REMARKS

These remarks are made in response to the Final Office Action dated June 2, 2005. In the Office Action, the Examiner rejected claims 1-27 under 35 U.S.C. § 103(a) as being unpatentable over Roeck *et al.*, U.S. Patent No. 6,574,796 (hereinafter *Roeck*) in view of Shahar et al., U.S. Patent Pub. No. 2003/0002495 (hereinafter *Shahar*).

No claim amendments are made herein. For the reasons set forth below, the Applicants respectfully request reconsideration and allowance of all pending claims.

CLAIM REJECTIONS - 35 U.S.C. § 103

To establish a *prima facie* case of obviousness, there must first be some suggestion or motivation to modify a reference or to combine references, and second be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j) from *In Re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed device; and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the Applicants' disclosure. *Amgen v. Chugai Pharmaceutical*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991), *Fritsch v. Lin*, 21 USPQ2d 1731 (Bd. Pat. App. & Int'f 1991). An invention is non-obvious if the references fail not only to expressly disclose the claimed invention as a whole, but also to suggest to one of ordinary skill in the art modifications needed to meet all the claim

limitations. *Litton Industrial Products, Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 164, 225 USPQ 34, 38 (Fed. Cir. 1985).

The examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. M.P.E.P. § 70602(j) from *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Obviousness cannot be established by combining references without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. M.P.E.P. § 2144 from *Ex parte Levengood*, 28 USPQ2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) (emphasis added by M.P.E.P.).

Each of claims 1-27 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over *Roeck* in view of *Shahar*. As an exemplary independent claim, claim 1 recites,

1. A method for identifying data channels within a cable broadband signal, comprising:

tuning a receiver of a cable modem to a first of a plurality of channels within a received cable broadband signal;

searching for a pilot tone within the tuned channel; and

updating one or more operating parameters of the cable modem to denote the tuned channel is a data channel if the pilot tone is detected.

With respect to claim 1, the Examiner states,

> As to claim 1, *Roeck* discloses a fast and reliable method/system for detecting a data channel within a data-over-cable system. *Roeck* achieves this via tuning a receiver to a first of a plurality of channels within a broadband signal and then performing an analysis on the channels in order to determine which are data channels. (Abstract; Col. 1, Ln. 16-20; Col. 3, Ln. 6-27; Col. 4, Ln. 22-67 thru Col. 5, Ln. 1-44). But, *Roeck* fails to specifically teach the use of a pilot signal to achieve this objective. However, within the same field of endeavor, *Shahar* discloses a similar system utilizing a cable modem, which searches for a pilot tone in order to decipher which channels are data channels. Once ascertained, the system determines which modulation method should be applied (i.e.,

updating operating parameters). (Pars. [0005] & 0048-0052]). Moreover, *Roeck* discloses various other well-known methods of efficiently detecting data channels utilized by cable modems.

Shahar goes on to disclose a strong motivation to combine. In Paragraphs 0048-0052, *Shahar* teaches the use of pilot signals result in a faster channel acquisition, robust channel tracking, and allows the system to acquire locks on data channels without the need to demodulate. (Pars. [0048-0052]. Accordingly, it would have been obvious to one of ordinary skill in this art at the time of applicant's invention to combine the systems of *Roeck* and *Shahar* in order to create a channel detector utilizing a pilot tone within a data-over cable system, thereby providing a faster and more efficient cable system.

Applicant respectfully disagrees with the Examiner's assessment of the cited art. In particular, Applicant asserts that *Shahar* does not teach use of pilot signals to identify (*i.e.*, distinguish) data channels, nor would there be any motivation to combine the teachings of *Roeck* and *Shahar* with respect to claim 1 or any of the other pending claims or any expectation of success.

As stated in the Abstract, *Roeck* discloses,

Apparatus, methods, and computer program products are disclosed for detecting or locating a viable data carrier in a downstream channel by a cable modem. When a cable modem is first installed by a cable operator or powered up by a user, it must first locate or tune in to the correct downstream channel in order to receive data from the headend of the cable plant. This time-consuming process can be shortened by performing two matches between the selected, potential downstream data carrier and constellation diagrams of certain modulation schemes. Through this method, potential channels for data carriers can be eliminated quickly by going through a "screening" process (the first constellation diagram match) thereby preventing those potential channels from going through a significantly more time-consuming second constellation match. The process begins with selecting a potential frequency channel from the downstream band. It is then determined whether the potential channel contains a signal modulated in a particular modulation scheme where the modulation scheme is one not normally used on signals in the downstream channel, such as QPSK. If the signal in the potential frequency channel is not modulated according to the particular modulation scheme, the cable modem determines whether the signal in the potential channel is modulated according to another particular modulation scheme, such as QAM64 or QAM256. These particular modulation schemes, however, are ones normally used on signals in the downstream channel. The determination of whether the

signal in the potential channel is modulated according to the first particular modulation scheme is done rapidly and only potential channels containing a signal likely to be modulated according to the second particular modulation scheme are examined for the second determination step.

Meanwhile, as stated in the Abstract, *Shahar* discloses,

> A system and method for adaptive modulation of downstream communication between a wireless hub and a wireless modem on a selected downstream channel is provided. The adaptive modulation allows for changing the downstream modulation on a packet by packet basis. The downstream modulation is changed by specifying modulation parameters including any of a modulation format, symbol rate, and FEC for each packet. A super frame may be utilized that includes a header that specifies different modulation parameters for each of multiple data packets associated with the super frame. The modulated transmissions are sent on fixed bandwidth channels that are specified based on the bit rate of the modulated transmission.

The purpose of the various embodiments of the present invention is to identify data channels from amongst multiple channels employed in a cable system. As stated in the Background section on page 3, lines 9-12, "Given the typical implementation of 6MHz channels over a spectrum of 91-857MHz, one of the problems cable modems have is identifying which of the over 125 channels in the broadband signal are data channels, and which are allocated to other programming (*e.g.*, A/V) channels." Over the lifetime of a cable system, it is most likely that the operator will reassign use of various channels within the cable broadband signal bandwidth for different purposes. For example, it is common for a cable operator to reassign given cable programming, such as ESPN, Discovery Channel, etc., to a different cable channel (*e.g.*, one of the over 125 channels discussed above).

Typical cable channel usage includes both analog channels (*e.g.*, used to carry TV broadcast content in analog form), and digital channels (used to carry TV broadcast content in digital form, as well as carrying additional digital content such as the content used for displaying electronic program guides and the like). In addition to these types of channels, a portion of cable broadband signal channels are used as data channels

via which data can be sent over cable system infrastructure using a cable modem. As with the analog and digital cable programming channels, the channels assigned for data channels may change over time. When such changes occur, it is advantageous for the cable modems to ascertain which channels are available as data channels as soon as practical so that those channels may be accessed for both uplink and downlink purposes. As discussed in the Background section of the present application, conventional techniques for ascertaining the data channels include a brute force scheme under which each of the channels is examined by demodulating the content to determine whether the channel is a data channel, which often requires over a minute to complete. (Consider that under a conventional approach, both a digital channel and data channel appear the same). The Background section of *Roeck* discusses similar problems.

Under embodiments of the claimed invention, a pilot tone is added to the channels in the cable broadband signal used for data channels. This pilot tone, through appropriate techniques disclosed and claimed, can easily identify which channels include a pilot tone, and thus which channels are data channels. At the same time, the pilot tone does not interfere with the use of the data channels.

Shahar employs an in-phase pilot signal that is used for an entirely different purpose and in an entirely different environment than that employed by the present invention. This will be made clear below.

With respect to citing paragraph [0005] of *Shahar*, Applicant is unclear on how this ties into the teachings of *Shahar* at all. This paragraph, which is in the background, refers to FIG. 1, and states:

> A known wireless broadband access system, which operates at a range of between 50 MHz and 864 MHz, but not in the MMDS, WCS, or ITFS/MMDS bands, is the data over cable specification system, which is specified in the data over cable system interface specifications (DOCSIS). An overview of a wireless DOCSIS system is depicted in FIG. 1. A CMTS 10 communicates with a wide area network 20, such as the Internet. The CMTS 10 can transmit signals from the wide area network 20 along a

cable network 30 through cable modems 40 to CPE 50. CPE 50 messages can be transmitted to the wide area network 20 through the cable modem 40 along the cable network 30 to the CMTS 10.

The system shown in FIG. 1 is a wired cable system. There clearly are no wireless aspects at all. In contrast, *Shahar*'s system and method pertain to broadband wireless usage, which employs a totally different modulation scheme and carrier frequency range than that employed by a cable system.

As stated in paragraphs [0048-0052] cited by the Examiner, *Shahar* states,

> During initialization of the wireless modem with the wireless base station, *each wireless modem is assigned a downstream channel for communication with the wireless base station*. Each downstream channel includes a number of different modulation types, which allow an increase in the information rate transmitted by using a higher modulation rate on the downstream channel or increase robustness by using a lower modulation rate. *In order to maintain carrier, symbol and packet synchronization while utilizing multiple downstream modulation formats, additional information beyond the information utilized for basic downstream communication is presently preferred to be transmitted during downstream communication*. The additional information is presently preferred to include:
>
> [0049] 1. *An in-phase pilot, which is added to the QAM data signal.* The in-phase pilot is a low power carrier that is transmitted along with the modulated signal. *The in-phase pilot allows the wireless modem to determine and lock onto the carrier so that it can properly determine and demodulate the appropriate constellation*. The transmission of the pilot carrier enables fast carrier synchronization and maintenance. The pilot enables the receiver to maintain a lock on the carrier of the modulated signal even if the receiver cannot decode the modulated signal (e.g., a receiver having only QPSK or QAM 16 decoding capabilities, but receiving a QAM 64 signal). Further, by providing fast carrier synchronization the system can quickly respond to multi-path and interference, increasing robustness the transmission of the pilot carrier increases the robustness with respect to multipath and interference.
>
> [0050] Carrier tracking will be done by all CPEs that can successfully lock and receive data using at least the QPSK modulation signal. Preferably, carrier tracking is done continuously by all CPEs, using symbol data that is delivered to all the CPEs. A CPE that is not receiving data will keep a continuous lock on the carrier.
>
> [0051] *An in-phase pilot is added to the signal to support carrier tracking even before timing and channel lock is achieved. The pilot is added to provide robust channel tracking in all marginal reception*

conditions even when timing tracking becomes marginal. The pilot signal is added to the transmitted signal by adding a DC value to the I (in phase) component of each symbol. In one embodiment, the DC value is added at a level of -8dB of the RMS of the constellation of the data signal. This level of pilot amplitude adds 0.3dB to the total energy of transmission.

> [0052] Carrier tracking can be done using the pilot for channel acquisition and tracking while a data aided tracking method can be used for channel demodulation. The pilot eliminates the 90 degrees rotation invariance of the quadrature demodulation, mostly needed for the QPSK modulation, thus saving 3dB SNR noise margin. (Emphasis added)

Under the *Shahar* system, a given wireless base station supports multiple wireless modems. At the same time, a single given channel is assigned to each wireless modem. Rather than use a pilot signal to identify such downstream channels, as asserted by the Examiner, *Shahar* employs a downstream channel descriptor for this purpose, as described (in part) in paragraph [0032], which states,

> Considering the large number of possible downstream PHY schemes, automatic channel acquisition is maintained by periodically transmitting a Downstream Channel Descriptor (DCD) message over the downstream channels. These messages enable the wireless modem to acquire the information regarding all the applicable downstream channels (i.e., channels serving the user sector).

Clearly, the pilot signal is not used to identify data channels (as apart from non-data channels). All of the channels received at a wireless modem are data channels. The DCD is used to identify which channels are available for a given user (i.e., wireless modem).

It is also clear that the pilot signal is used to lock on to a channel having predetermined parameters, not to identify a data channel. This type of feature is often necessary for wireless transmission due to wireless signal propagation effects, such as fade, frequency shift and the like. In this case, the transmitted channel and the received channel frequencies may be slightly different and/or the timing of the modulation scheme is slightly skewed. The pilot signal enables locking on to a channel (i.e., tuning to better receive the channel and/or decipher the modulated data on the

channel), similar to when one used to have to manually tune an analog radio signal that would fad in and out (note-today's radios provide automated mechanisms for this purpose).

In addition, there would be no motivation to combine the teachings of *Roeck* and *Shahar* to obtain the invention of claim 1, nor any expectation of success. *Roeck* employs a technique for identifying data carriers using a first constellation diagram match to perform a screening process, followed by a longer second constellation match for those channel frequencies meeting the first screening condition. Thus, the *Roeck* scheme already solves a data channel identification problem. There would be no advantage to adding the pilot signal of *Shahar* to identify the data channels, since, as discussed above, the pilot signal is used for a totally different purpose (that is to assist in locking onto a known data channel having a known frequency and modulation scheme as provided by the DCD data (see, *e.g.*, TABLES 2 and 3)). The motivation for using the pilot signal for channel-locking purposes does not exist (or minimally might exist) in a cable system, especially when using the hybrid fiber coaxial (HFC) system discussed in the background section of *Roeck* and commonly deployed by modern cable systems. In other words, due to the excellent transmission characteristics of optical fiber, there is minimal signal loss and associated anomalies, such as frequency shift and modulation distortion, especially when compared to wireless transmissions. Thus, there is no shift in signal frequency, and no change in modulation timing. The net result, is there is no need to employ a pilot signal for channel-locking purposes. More importantly, such a pilot signal would not be employed for identifying data channels.

It is clear from above that the combination of *Roeck* and *Shahar* do not meet all three prongs of the *In Re Vaeck* test with respect to the invention of claim 1, and thus an obviousness rejection of claim 1 over *Roeck* in view of *Shahar* is improper and should be withdrawn. Furthermore, each of claim 1-9, which either depend directly or

indirectly from claim 1, are patentable over the combination of *Roeck* and *Shahar* for at least the same reasons.

With further respect to independent claim 10, this claim recites a cable modem that is configured to perform operations that are analogous to the method operations of claim 1. Accordingly, claim 10 is patentable over the combination of *Roeck* and *Shahar* for similar reasons presented above in support of allowance of claim 1. Additionally, each of claim 11-19, which either depend directly or indirectly from claim 10, are patentable over the combination of *Roeck* and *Shahar* for at least the same reasons.

With further respect to independent claim 20, this claim recites a machine accessible storage medium to store instructions that perform operations that are analogous to the method operations of claim 1 when executed. Accordingly, claim 20 is patentable over the combination of *Roeck* and *Shahar* for similar reasons presented above in support of allowance of claim 1. Additionally, each of claim 21-27, which either depend directly or indirectly from claim 20, are patentable over the combination of *Roeck* and *Shahar* for at least the same reasons.

With further respect to the Examiners note of:

> [NOTE: The use of pilot signals to locate data channels is well known in the art of telecommunications. (As evidenced by Hughes, US Pat. No. 6,122,334 and Yamamoto, US Pat. No. 6,463,829)],

Applicant respectfully asserts that again, the use of the pilot signals by Hughes and Yamamoto are used for entirely different purposes than that employed by and claimed in the present application. Each of Hughes and Yamamoto employ pilot signals for wireless communication purposes. More specifically, each of Hughes and Yamamoto employ pilot signals for wireless CDMA systems, which employ a totally different modulation scheme than cable systems. Furthermore, all of the channels in a CDMA system comprise data channels; whether or not a given channel ultimately carries voice traffic or data traffic is immaterial to the CDMA encoding scheme employed by the

system. In summary, the use of pilot signals as disclosed by Hughes and Yamamoto are clearly irrelevant to patentability of the present invention.

Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, independent claims 1, 10, and 20 are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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